

Programming Assignment I

This assignment asks you to write a short program in the language you chose. This assignment will be done at most with one partner.

A machine with only a single stack for storage is a *stack machine*. Consider the following very primitive language for programming a stack machine:

<i>Command</i>	<i>Meaning</i>
<i>int</i>	push the integer <i>int</i> on the stack
+	push a '+' on the stack
s	push an 's' on the stack
e	evaluate the top of the stack (see below)
d	display contents of the stack
x	stop

The 'd' command simply prints out the contents of the stack, one element per line, beginning with the top of the stack. The behavior of the 'e' command depends on the contents of the stack when 'e' is issued:

- If '+' is on the top of the stack, then the '+' is popped off the stack, the following two integers are popped and added, and the result is pushed back on the stack.
- If 's' is on top of the stack, then the 's' is popped and the following two items are swapped on the stack.
- If an integer is on top of the stack or the stack is empty, the stack is left unchanged.

The following examples show the effect of the 'e' command in various situations; the top of the stack is on the left:

<i>stack before</i>	<i>stack after</i>
+ 1 2 5 s...	3 5 s...
s 1 + + 99...	+ 1 + 99
1 + 3...	1 + 3...

You are to implement an interpreter for this language in the language you chose. Input to the program is a series of commands, one command per line. Your interpreter should prompt for commands with >. Your program need not do any error checking: you may assume that all commands are valid and that the appropriate number and type of arguments are on the stack for evaluation. You may also assume that the input integers are unsigned.

You are free to implement this program in any style you choose.

Sample session

The following is a sample compile and run of our solution.

```
>1
>+
```

```
>2
>s
>d
s
2
+
1
>e
>e
>d
3
>x
bye
```